

What is claimed is:

1. An axis determination apparatus for determining a center axis line of a surface of a circular substrate, comprising

5 a support mount for supporting said substrate placed on a surface thereof,

 a drive mechanism for rotating said support mount in a plane containing the surface of said support mount,

10 a light-emitting device disposed near a circumferential portion of said support mount, and
 a light-receiving device disposed, opposite to said light-emitting device, near the circumferential portion of said support mount,

15 said light-emitting device emitting a beam of light to said light-receiving device.

2. The axis determination apparatus according to claim 1, wherein

20 said light-receiving device is disposed so as to receive the beam of light emitted by said light-emitting device through a notch provided on the circumferential portion of said substrate when the notch stays between said light-emitting device and said light-receiving device.

25 3. An axis determination apparatus for determining a

center axis line of a surface of a circular substrate,
comprising

a support mount for supporting said substrate placed
on a surface thereof,

5 a lifter, formed generally in a shape of a cube,
including a support member arranged on a circumference with
a center of said support mount and a projected member
projected towards said center under said support member,
for supporting said substrate with a circumferential
10 portion of said substrate sitting on said projected member,
and

a lifting mechanism for hoisting and lowering said
lifter near said support mount, wherein
an inclined surface sloped towards said projected
15 member is provided on said support member, and
said lifter transfers said substrate onto the surface
of said support mount when said lifter lowered below said
support mount while supporting said substrate.

20 4. The axis determination apparatus according to
claim 1, wherein said substrate is clamped against said
support mount.

25 5. A film-thickness measurement apparatus comprising
an axis determination apparatus for determining a

center axis line of a surface of a circular substrate and a measurement apparatus for measuring a thickness of an electrically conductive thin film formed on the surface of said substrate, wherein

5 said axis determination apparatus includes
 a support mount for supporting said substrate placed on a surface thereof,
 a drive mechanism for rotating said support mount in a plane containing the surface of said support
10 mount,
 a light-emitting device disposed near a circumferential portion of said support mount, and
 a light-receiving device disposed, opposite to said light-emitting device, near the circumferential portion of said support mount, said light-emitting device being designed to emit a beam of light to said light-receiving device, and
15 said measurement apparatus determines a measurement position on the surface of said substrate to measure the thickness of said electrically conductive thin film at said measurement position in accordance with said center axis line determined by said axis determination apparatus.

6. The film-thickness measurement apparatus according
25 to claim 5, wherein

said measurement apparatus comprises a film-thickness sensor, a power source, and a measurement device,

 said film-thickness sensor including a measurement coil,

5 said power source applying an AC voltage to said measurement coil when said substrate is in close proximity to said measurement coil to generate an eddy current in the electrically conductive thin film on the surface of said substrate,

10 said measurement device being designed to measure a signal generated in said measurement coil by an effect of said eddy current.

7. The film-thickness measurement apparatus according
15 to claim 6, wherein

 said film-thickness sensor comprises a reference coil and two reference resistors,

 said reference coil being connected in series to said measurement coil and arranged to stay farther away from
20 said substrate than said measurement coil when said measurement coil faces said substrate,

 said two reference resistors being connected in series to each other, the serially-connected circuit of said two reference resistors being connected in parallel to
25 the serially-connected circuit of said measurement coil and

said reference coil,

said measurement device being designed to measure the potential difference between the connection of said measurement coil and said reference coil and the connection 5 of said two reference resistors as a signal generated in said measurement coil when an AC voltage is applied both end of the serially-connected circuit of said measurement coil and said reference coil.

8. A deposition apparatus comprising

10 deposition means for depositing a thin film on a surface of a circular substrate, and

a film-thickness measurement apparatus for measuring a thickness of the thin film on the surface of said substrate, wherein

15 said film-thickness measurement apparatus includes

an axis determination apparatus for determining a center axis line of the surface of the circular substrate, and

a measurement apparatus for measuring the

20 thickness of an electrically conductive thin film formed on the surface of said substrate, wherein

said axis determination apparatus includes

a support mount for supporting said substrate placed on a surface thereof,

25 a drive mechanism for rotating said support

mount in a plane containing the surface of said support mount,

a light-emitting device disposed near a circumferential portion of said support mount, and

5 a light-receiving device disposed, opposite to said light-emitting device, near the circumferential portion of said support mount, said light-emitting device being designed to emit a beam of light to said light-receiving device, and

10 said measurement apparatus determines a measurement position on the surface of said substrate to measure the thickness of said electrically conductive thin film at said measurement position in accordance with said center axis line determined by said axis determination apparatus.

15 9. An axis determination method for determining a center axis line of a surface of a circular substrate having a notch on part of a circumferential portion of said substrate comprising the steps of:

20 determining a center of the surface of said substrate, irradiating the circumferential portion of said substrate with a beam of light emitted from a light-emitting device, while rotating said substrate in a plane containing the surface of said substrate with the center of
25 the surface to interpose the circumferential portion of

said substrate between said light-emitting device disposed
 opposite to a light-receiving device, in order to detect
 the position of said notch depending on whether or not said
 beam of light passes through said notch to be received by
5 said light-receiving device, and

 determining the center axis line of the surface of
 said substrate in accordance with the position of said
 notch and the center of the surface.

10 10. A film-thickness measurement method for measuring
 a thickness of a film, comprising the steps of:

 determining a center of a surface of a circular
 substrate having a notch formed on part of a
 circumferential portion of said substrate and having an
15 electrically conductive thin film deposited on the surface,
 irradiating the circumferential portion of said
 substrate with a beam of light emitted from a light-
 emitting device, while rotating said substrate in a plane
 containing the surface of said substrate with the center of
20 the surface to interpose the circumferential portion of
 said substrate between said light-emitting device disposed
 opposite to a light-receiving device, in order to detect
 the position of said notch depending on whether or not said
 beam of light passes through said notch to be received by
25 said light-receiving device,

determining the center axis line of the surface of said substrate in accordance with the position of said notch and the center of the surface, and

5 determining a measurement position on the surface of
said substrate in accordance with said center axis line,
measuring the thickness of said electrically conductive thin film at said measurement position.

11. The film-thickness measurement method according
10 to claim 10, further comprising the steps of:

disposing a measurement coil in close proximity to
said substrate,

applying an AC voltage to said measurement coil to
generate an eddy current in the electrically conductive

15 thin film on the surface of said substrate, and

detecting a signal produced in said measurement coil
by an effect of said eddy current to determine the
thickness of said electrically conductive thin film in
accordance with said signal.

20 12. The film-thickness measurement method according
to claim 11, further comprising the steps of:

preparing a Maxwell's inductance bridge by connecting
a serially-connected circuit of two reference resistors in
parallel to a serially-connected circuit of a measurement
25 coil and a reference coil, said serially-connected circuit

of two reference resistors having two reference resistors connected in series to each other, said reference coil connected in series to said measurement coil being disposed at a position farther away from said substrate than said

5 measurement coil, and

determining a variation in inductance component of said measurement coil and thereby detect a signal produced in said measurement coil by using said Maxwell's inductance bridge.